



# Multiple-Pulse Operation and Bound States of Solitons in Passive Mode-Locked Fiber Lasers

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Résumé en anglais

We present results of our research on a multiple-pulse operation of passive mode-locked fiber lasers. The research has been performed on basis of numerical simulation. Multihysteresis dependence of both an intracavity energy and peak intensities of intracavity ultrashort pulses on pump power is found. It is shown that the change of a number of ultrashort pulses in a laser cavity can be realized by hard as well as soft regimes of an excitation and an annihilation of new solitons. Bound steady states of interacting solitons are studied for various mechanisms of nonlinear losses shaping ultrashort pulses. Possibility of coding of information on basis of soliton trains with various bonds between neighboring pulses is discussed. The role of dispersive wave emitted by solitons because of lumped intracavity elements in a formation of powerful soliton wings is analyzed. It is found that such powerful wings result in large bounding energies of interacting solitons in steady states. Various problems of a soliton interaction in passive mode-locked fiber lasers are discussed.

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